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The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

Paper No. 18

UNITED STATES PATENT AND TRADEMARK OFFICE

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U.S. PATENT AND TRADEMARK OFFICE
BOARD OF PATENT APPEALS
AND INTERFERENCES

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte ULRICH BENZLER and OLIVER WERNER

Appeal No. 2004-1612
Application No. 09/462,863¹

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Before RUGGIERO, LEVY, and SAADAT, Administrative Patent Judges.
SAADAT, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal from the Examiner's final rejection of claims 6-12, which are all of the claims pending in this application.

We reverse.

BACKGROUND

Appellants' invention is directed to generating an improved image signal when estimating the motion of image sequences by

¹ Application for patent filed May 8, 2000, which is the national stage application under 35 U.S.C. § 371 of PCT Application No. PCT/DE98/01938, filed July 11, 1998, which claims the foreign filing priority benefit of the German Application No. 197 30 305.6, filed July 15, 1997.

considering a greater neighborhood than in the case of bilinear interpolation and thus, generating pixels between the pixel scanning raster. According to Appellants, using such predicted signals improves the quality of the prediction signal and the coding efficiency.

Representative independent claim 6 is reproduced below:

6. A method for generating an image signal when estimating a motion of image sequences, motion vectors indicating, for each picture block of a current image, a position of the picture block used for a prediction with respect to a chronologically preceding reference image, the motion vectors being formed for each picture block, the method comprising the steps of:

in a first search step, determining a first motion vector with a pel accuracy;

starting out from the first motion vector, in a second search step, determining a second motion vector with a sub-pel accuracy by an aliasing-reducing interpolation filtering, using a digital filter, a resolution being selected to be higher than that corresponding to a resolution of a pixel raster in the first search step, more than four neighboring pixels being utilized for an interpolation of each pixel, to interpolate pixels between a scanning raster for the first search step; and

in a third search step, starting from the second motion vector, determining a third motion vector by a further interpolation filtering using the digital filter, a resolution being increased once more in comparison with the second search step, an interpolation being carried out on the basis of a pixel raster, with a resolution in the second search step.

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The Examiner relies on the following references in rejecting the claims:

Thomas	4,890,160	Dec. 26, 1989
Eifrig et al. (Eifrig)	5,991,447	Nov. 23, 1999

Manfred Ziegler (Ziegler), "Hierarchical Motion Estimation Using the Phase Correlation Method in 140 MBIT/S HDTV-Coding," Proceedings of the Third International Workshop on HDTV, Turin, Italy, Aug. 30-Sep. 1, 1989, pp. 131-137.

Claims 6-10 and 12 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Ziegler and Thomas.

Claim 11 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Ziegler and Thomas and further in view of Eifrig.

We make reference to the answer (Paper No. 15, mailed December 3, 2003) for the Examiner's reasoning, and to the appeal brief (Paper No. 14, filed August 25, 2003) and the reply brief (Paper No. 16, filed February 2, 2004) for Appellants' arguments thereagainst.

OPINION

With respect to the rejection of claims 6-10 and 12, the Examiner relies on Ziegler for disclosing most of the claimed method steps and further relies on Thomas (col. 9, lines 25-55) for teaching the use of more than four neighboring pixels for an interpolation of each pixel (answer, page 3). Appellants argue

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that Thomas uses only the four nearest pixels and not the claimed "more than four neighboring pixels" for an interpolation of each pixel (brief, page 8).

In response to Appellants' arguments, the Examiner asserts that Thomas, in the specified portion, also discloses using a "cubic spline fit" which "the Examiner considers ... as having eight neighboring pixels, which clearly meets the limitation of 'more than four neighboring pixels.'" (answer, page 5). In response, Appellants argue that the Examiner's assumption that eight neighboring pixels are involved, is neither supported by the reference, nor consistent with the definition of the cubic spline fit (reply brief, page 3). Appellants further provide two separate definitions for "cubic spline fit" wherein interpolation is done for consecutive data points or between a pair of data points, which limits the number of pixels to two and therefore, is not the same as the claimed "more than four neighboring pixels" (id.).

As a general proposition, in rejecting claims under 35 U.S.C. § 103, the examiner bears the initial burden of presenting a prima facie case of obviousness. See In re Rijckaert, 9 F.3d 1531, 1532, 28 USPQ2d 1955, 1956 (Fed. Cir. 1993) and In re Fine, 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). A

prima facie case of obviousness is established when the teachings of the prior art itself would appear to have suggested the claimed subject matter to one of ordinary skill in the art. See In re Bell, 991 F.2d 781, 783, 26 USPQ2d 1529, 1531 (Fed. Cir. 1993); In re Fritch, 972 F.2d 1260, 1266 n.14, 23 USPQ2d 1780, 1783-84 n.14 (Fed. Cir. 1992); Uniroyal, Inc. v. Rudkin-Wiley Corp., 837 F.2d 1044, 1051, 5 USPQ2d 1434, 1438 (Fed. Cir. 1988); Ashland Oil, Inc. v. Delta Resins & Refractories, Inc., 776 F.2d 281, 293, 227 USPQ 657, 664 (Fed. Cir. 1985). In considering the question of the obviousness of the claimed invention in view of the prior art relied upon, the Examiner is expected to make the factual determination set forth in Graham v. John Deere Co., 383 U.S. 1, 17, 148 USPQ 459, 467 (1966), and to provide a reason why one having ordinary skill in the pertinent art would have been led to modify the prior art or to combine prior art references to arrive at the claimed invention. See also In re Rouffet, 149 F.3d 1350, 1355, 47 USPQ2d 1453, 1456 (Fed. Cir. 1998).

Based on the positions argued above, the determinative inquiry in this case is whether Thomas discloses using more than four neighboring pixels for an interpolation of each pixel. After a review of Thomas and consideration of the arguments set forth by Appellants and the Examiner, we agree with Appellants

that the claimed feature of using more than four neighboring pixels is not taught by Thomas. The reference either takes a weighted sum of the values of the four nearest pixels or uses a two dimensional cubic spline fit for interpolation (col 9, lines 44-55). Based on the record before us, we remain unconvinced by the Examiner's assertion (answer, page 5) that the interpolation method disclosed by Thomas involves more than four pixels. What a reference teaches is a question of fact. In re Baird, 16 F.3d 380, 382, 29 USPQ2d 1550, 1552 (Fed. Cir. 1994) (citing In re Beattie, 974 F.2d 1309, 1311, 24 USPQ2d 1040, 1041 (Fed. Cir. 1992)). Here, absent any evidentiary support, the Examiner's assumption that "cubic spline fit" has a number of eight pixels (answer, page 5), is mere speculation.² Therefore, considering the presented evidence in support for establishing the meaning of the term "cubic spline fit" (reply brief, page 3), we agree with Appellants that the interpolation disclosed by Thomas does not involve more than four pixels.

Thus, assuming, arguendo, that it would have been obvious to combine Ziegler with Thomas, as held by the Examiner, the

² If the Examiner is aware of any evidence that would establish the number of pixels involved in a cubic spline fit to be more than four, the Examiner is encouraged to consider the possibility of applying such evidence in combination with the current prior art in rejecting the claims.

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combination would still fall short of teaching the claimed "more than four neighboring pixels" for an interpolation of each pixel. Therefore, as the Examiner has failed to set forth a prima facie case of obviousness, we cannot sustain the 35 U.S.C. § 103 rejection of claims 6-10 and 12 over Ziegler and Thomas.

With respect to the rejection of claim 11, the Examiner further relies on Eifrig for predicting video objects and for inserting coefficients into a bit stream (answer, page 4). However, Eifrig contains no teaching or suggestion related to the claimed use of more than four neighboring pixels and therefore fails to overcome the deficiencies of Ziegler and Thomas as discussed above. Therefore, the 35 U.S.C. § 103 rejection of claim 11 over Ziegler, and Thomas and Eifrig cannot be sustained.

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CONCLUSION

In view of the foregoing, the decision of the Examiner rejecting claims 6-12 under 35 U.S.C. § 103 is reversed.

REVERSED

Joseph F. Ruggiero
JOSEPH F. RUGGIERO)
Administrative Patent Judge)
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Stuart S. Levy
STUART S. LEVY) BOARD OF PATENT
Administrative Patent Judge) APPEALS
) AND
) INTERFERENCES
)
Mahshid D. Saadat
MAHSHID D. SAADAT)
Administrative Patent Judge)

MDS/ki

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Kenyon & Kenyon
One Broadway
New York, NY 10004